Portland Harbor RI/FS
Summary of Fish Consumption Issues and Their Resolution

(1) Four consumption rates will be used for adults and 4 for children (see discussion on Exposure Point Concentrations (EPCs) for more detail on the application of these rates). For adults, three of these rates (73 g/day, 142.2 g/day and 175 g/day) represent higher end (~ 95th percentile) consumption rates for the recreational fisher, the non-tribal high fish consumer, and Native Americans, respectively. The corresponding fish consumption rates for children are 31, 60, and 73 grams per day (See attachment 1).

The fish ingestion rate of 17.5 grams per day will be used as an average fish ingestion rate for recreational fishers. No other average fish consumption rates will be used for the following reasons:

- The range of fish consumption rates being used (from 17.5 to 175 g/day) includes any average ingestion rates that would be chosen for non-tribal fish consumers and Native Americans. Therefore, this range will provide the information needed by the EPA risk managers to determine the need for remediation at the site.

- Adding more values for central tendency will not aid in decision making and will only complicate the discussion of risks with the public. From the discussion and table below, it is expected that the calculations for cancer risk and non-cancer hazards from consumption of resident fish species only (bass, sucker, carp and bullhead) would result in 306 different calculations [17 EPCs by location (mile reach, each 3 mile reach, and entire river for individual species plus multiple species) X 3 ingestion rates X 3 (adult cancer, adult non-cancer and child non-cancer estimates) X 2 (for whole body and fillet with skin) = 306 calculations]. This does not include the risk estimates for crayfish and for the multiple species diet for Native Americans.

(2) Fraction from the source will not be dealt with quantitatively in the risk assessment but can be discussed qualitatively in the Uncertainty Section.

(3) The assumption of a multiple species diet will be included as a part of some of the risk assessment calculations (described below in discussion on EPCs).

(4) Exposure Point Concentrations and Fish Ingestion Rates -

(A) Resident Fish Species - For all resident fish species collected as a part of the Round 1 RI sampling, the adult ingestion rates of 17.5, 73, 142.4 grams/day and the child ingestion rates of 7, 31, and 60 grams/day will be used with EPCs calculated for the following scenarios:

		river mile	3 -6 miles	6 - 9 miles	entire river
bass		X[1]			X[3]
sucker			X[2]	X[2]	X[3]
carp			X[2]	X[2]	X[3]
bullhead			X[2]	X[2]	X[3]
multiple species					X[4]

[1]Three separate bass composites were caught at each of 6 river miles - EPCs will be calculated by river mile by using the maximum concentration of each chemical in any of the 3 composites in each river mile (by body type).
[2]Three separate composites for sucker, carp and bullhead were caught at 3 - 6 miles and at 6 - 9 miles; EPCs will be calculated for the 3 - 6 mile reach and for the 6 - 9 mile reach by using the maximum concentration of each chemical in any of the 3 composites in each reach for each species (by body type).
[3]EPCs will be calculated by using the maximum concentration of each chemical in any of the composites caught in the entire site.
[4]The EPCs for multiple species will be calculated by using the EPCs calculated for individual species in footnote 3)(by body type).

For estimating the EPCs, the method recommended for dealing with composites in EPA↘s Soil

Screening Guidance should be used (see page 12 of Soil Screening Guidance: User↘s Guide. EPA/540/R-96/018, 1996). Because compositing is a physical average, the SSL guidance recommends using the maximum of composites to estimate the EPC. The maximum of composites is a conservative estimate of the average (similar to the 95 percent UCL on the arithmetic average). The number of composite samples of each fish species taken per reach (one mile for bass and 3 miles for the other fish species) is 3 or less, therefore, the maximum level of each contaminant found in any of the 3 composites should be used to calculate the EPC for each reach. For the entire river, at least six samples should be available for each species; again the maximum level of each contaminant found in any composite from the entire river should be used to calculate the EPC. The Uncertainty Section of the risk assessment should include a discussion on the range of the major COPCs among replicates (e.g., bullhead, sucker, carp) and among samples caught at different locations (bass, crayfish, bullhead, sucker, carp) of the site.

For bass, sucker, carp and bullhead, a multiple species diet will be done by assuming that equal parts of the diet come from each fish. This will be done by using the river-wide EPCs (calculated as described above) for each species to calculate a multiple species EPC for the site.

(B) Tribal Multiple Species Diet - Resident species data, as well as salmon, lamprey and sturgeon data will be used in a multiple species diet for Native Americans with an ingestion rate of 175

grams per day. The CRITFC Fish Consumption Survey results will be used to determine the ingestion rate for each fish species within the 175 grams per day, as shown below:

Species	Grams/day[1]	Percent of Diet
Salmon	67	38.4
Lamprey	12.3	7.0
Sturgeon	8.6	4.9
Smelt	12.5	7.2
Whitefish	23.2	13.3
Trout	25.1	14.3
Walleye	9.9	5.7
Squawfish	3.7	2.1
Sucker	7.3	4.2
Shad	5.2	3.0
Total Ingestion Rate	**175**	**100.0**

[1] Grams per day are based upon weighted mean data in Table 18 of the CRITFC study.

Unless new data are collected, the EPCs to be used with the ingestion rates for salmon (67 g/day), lamprey (12.3 g/day), and sturgeon (8.6 g/day) will be calculated with data from the 2003 ODHS fish sampling effort. As with the resident fish, the maximum level of each contaminant found in any of the composites (for sturgeon and lamprey) should be used to calculate the EPC. Sturgeon were collected as individual samples. For individual samples, EPA guidance recommends that the EPC be calculated using the 95 percent UCL on the arithmetic average of the samples, or if the 95 percent UCL of the average is higher than the maximum value, the maximum value should be used. Since only 5 sturgeon were collected, it will not be possible to calculate a the 95 percent UCL on the arithmetic average; therefore, the maximum value for any contaminant found in any sturgeon should be used with the ingestion rate of 8.6 g/day. For the remaining resident species, each of the EPCs calculated for the entire river (site) for each species (described above) should be used with an ingestion rate of 21.7 g/day (i.e., the ingestion rate for the sum of resident species, 86.9 g/day, divided by 4).

For sturgeon, lamprey and salmon, the risk assessment will include a discussion on the

uncertainty in estimating the exact proportion of contaminants (and risk) that are from contaminants at the site.

(C) Crayfish - For crayfish, the adults ingestion rates of 3.3 and 18 grams per day will be used. These values represent the average (3.3 g/day) and the high-end (18 g/day) consumption rates for crayfish chosen for the site and will be used with EPCs calculated for each samples site as well as for the entire river (using the maximum level of each contaminant found in any of the composites in the entire river).